

HiPerFRED²

$$V_{RRM} = 400V$$

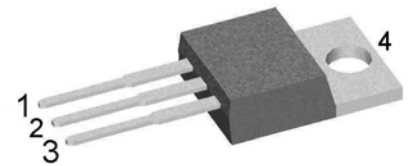
$$I_{FAV} = 2x \ 10A$$

$$t_{rr} = 45ns$$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Common Cathode

Part number

DPG20C400PB



Backside: cathode

**Features / Advantages:**

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

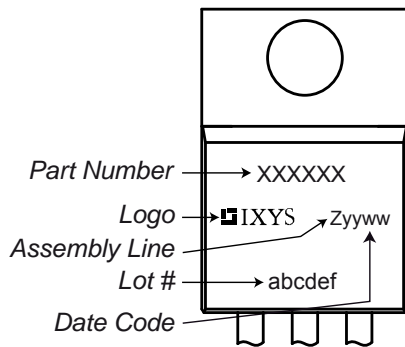
- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: TO-220

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Fast Diode				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			400	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			400	V
I_R	reverse current, drain current	$V_R = 400 V$	$T_{VJ} = 25^{\circ}C$		1	μA
		$V_R = 400 V$	$T_{VJ} = 150^{\circ}C$		0.15	mA
V_F	forward voltage drop	$I_F = 10 A$	$T_{VJ} = 25^{\circ}C$		1.32	V
		$I_F = 20 A$			1.51	V
		$I_F = 10 A$	$T_{VJ} = 150^{\circ}C$		1.03	V
		$I_F = 20 A$			1.24	V
I_{FAV}	average forward current	$T_C = 150^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		10	A
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.77	V
r_F	slope resistance				19.8	m Ω
R_{thJC}	thermal resistance junction to case				2.3	K/W
R_{thCH}	thermal resistance case to heatsink			0.50		K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		65	W
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		150	A
C_J	junction capacitance	$V_R = 200 V \quad f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		12	pF
I_{RM}	max. reverse recovery current	} $I_F = 10 A; V_R = 270 V$ $-di_F/dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		4	A
t_{rr}	reverse recovery time		$T_{VJ} = 125^{\circ}C$		6	A
			$T_{VJ} = 25^{\circ}C$		45	ns
			$T_{VJ} = 125^{\circ}C$		65	ns

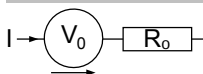
Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			35	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking

Part number

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 20 = Current Rating [A]
- C = Common Cathode
- 400 = Reverse Voltage [V]
- PB = TO-220AB (3)

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DPG20C400PB	DPG20C400PB	Tube	50	506647

Similar Part	Package	Voltage class
DPG20C400PN	TO-220ABFP (3)	400
DPG20C400PC	TO-263AB (D2Pak) (2)	400

Equivalent Circuits for Simulation
** on die level*
 $T_{VJ} = 175\text{ °C}$

Fast Diode

$V_{0\ max}$	threshold voltage	0.77	V
$R_{0\ max}$	slope resistance *	16.6	mΩ

Fast Diode

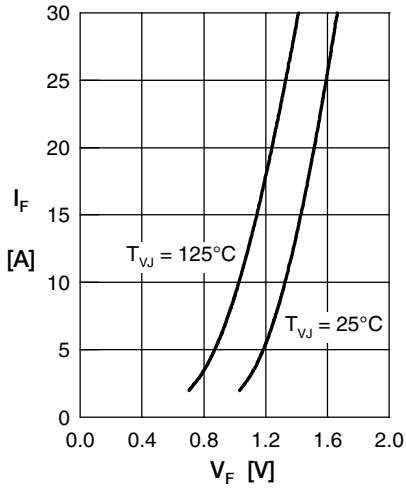


Fig. 1 Forward current I_F versus V_F

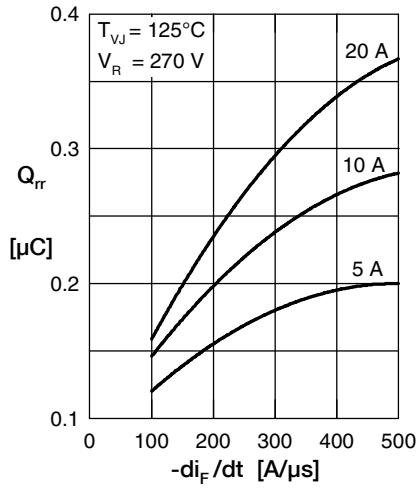


Fig. 2 Typ. reverse recov. charge Q_{rr} versus $-di_F/dt$

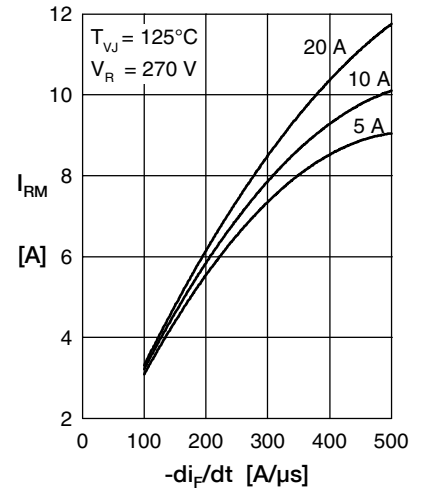


Fig. 3 Typ. reverse recov. current I_{RM} versus $-di_F/dt$

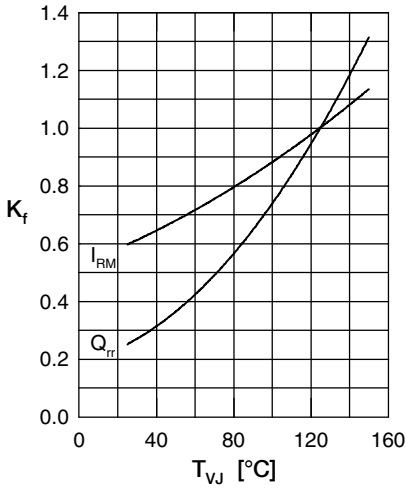


Fig. 4 Typ. dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

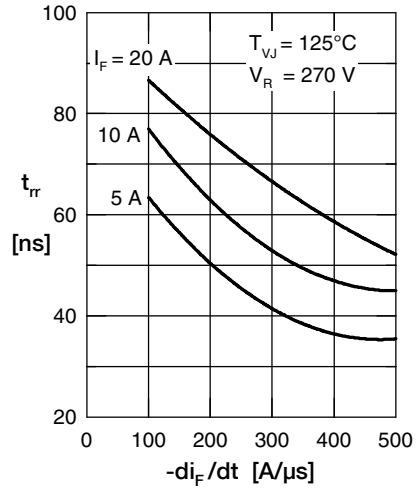


Fig. 5 Typ. reverse recov. time t_{rr} versus $-di_F/dt$

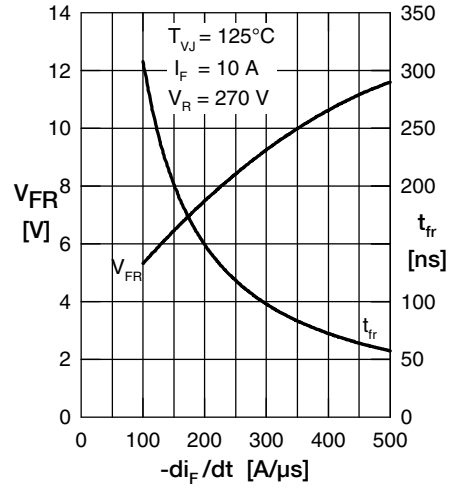


Fig. 6 Typ. forward recovery voltage V_{FR} and t_{fr} versus di_F/dt

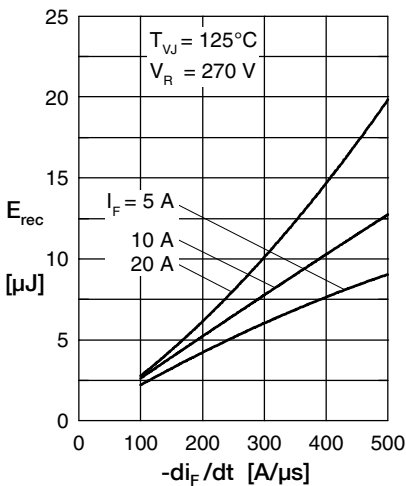


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

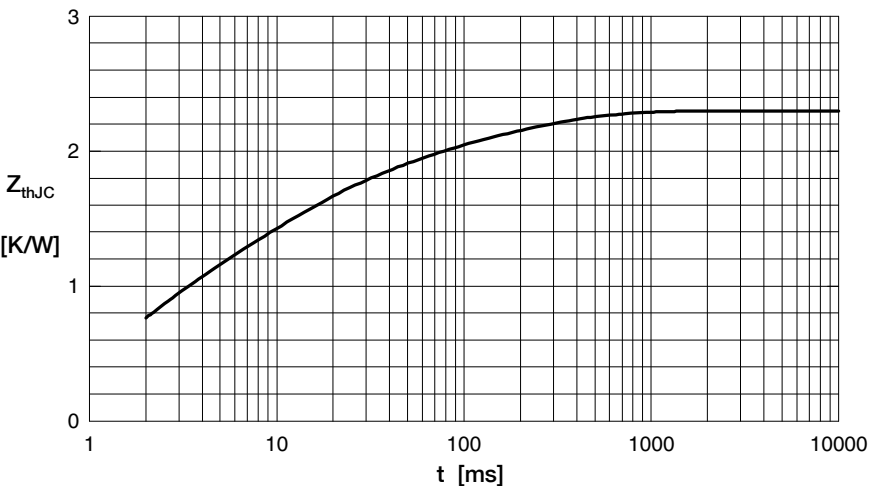


Fig. 8 Transient thermal resistance junction to case